

What is claimed:

1. A method to produce arachidonic acid, comprising culturing microorganisms of the genus *Mortierella* sect. *schmuckeri* in a medium comprising a source of assimilable organic carbon and a source of assimilable nitrogen.
- 5 2. The method of Claim 1, wherein said *Mortierella* sect. *schmuckeri* is capable of producing at least about 0.70 grams of arachidonic acid per liter per day.
3. The method of Claim 1, wherein said *Mortierella* sect. *schmuckeri* is capable of producing at least about 0.80
10 grams of arachidonic acid per liter per day.
4. The method of Claim 1, wherein said *Mortierella* sect. *schmuckeri* is capable of producing at least about 0.86 grams of arachidonic acid per liter per day.
5. The method of Claim 1, wherein said method comprises
15 culturing *Mortierella* sect. *schmuckeri* of the species *Mortierella schmuckeri*.
6. The method of Claim 1, wherein said method comprises culturing *Mortierella* sect. *schmuckeri* of the species *Mortierella camargensis*.
- 20 7. The method of Claim 1, wherein said *Mortierella* sect. *schmuckeri* is capable of growing as a dispersed filamentous form when grown under liquid culture conditions.

8. The method of Claim 1, wherein said medium comprises a complex nitrogen source.

9. The method of Claim 8, wherein said component increases arachidonic acid production by said *Mortierella* sect. *schmuckeri* by at least about 50 percent, as measured by percent cell dry weight or percent of total fatty acids in an oil, compared with *Mortierella* sect. *schmuckeri* grown in the absence of said complex nitrogen source.

10. The method of Claim 8, wherein said component increases arachidonic acid production by said *Mortierella* sect. *schmuckeri* by at least about 100 percent, as measured by percent cell dry weight or percent of total fatty acids in an oil, compared with *Mortierella* sect. *schmuckeri* grown in the absence of said complex nitrogen source.

11. The method of Claim 1, further comprising limiting a non-carbon nutrient sufficiently to stimulate lipid production in said microorganisms.

12. The method of Claim 11, wherein said non-carbon nutrient comprises nitrogen.

13. The method of Claim 1, wherein said method further comprises recovering lipids comprising said arachidonic acid from said *Mortierella* sect. *schmuckeri*.

14. A food product, comprising a microorganism of the genus *Mortierella* sect. *schmuckeri* and a food material.

15. The food product of Claim 14, wherein said food material comprises an animal food.

16. A food product, comprising lipids recovered from a microorganism of the genus *Mortierella* sect. *schmuckeri* and a food material.

17. The food product of Claim 16, wherein said *Mortierella* sect. *schmuckeri* is capable of producing at least about 0.70 grams of arachidonic acid per liter per day.

18. The food product of Claim 16, wherein said *Mortierella* sect. *schmuckeri* is of the species *Mortierella schmuckeri*.

19. The food product of Claim 16, wherein said *Mortierella* sect. *schmuckeri* is of the species *Mortierella camargensis*.

20. The food product of Claim 16, wherein said food product has a total fatty acid content in which up to about 20% by weight of total fatty acids is arachidonic acid.

21. The food product of Claim 16, wherein said food product has a total fatty acid content in which up to about 10% by weight of total fatty acids is arachidonic acid.

22. The food product of Claim 16, wherein said food product has a total fatty acid content in which between about 0.1% and about 1.0% by weight of total fatty acids is arachidonic acid.

23. The food product of Claim 16, wherein said food material comprises an infant food material.

24. The food product of Claim 16, wherein said food material is selected from the group consisting of infant formula and baby food.

25. A therapeutic agent, comprising lipids recovered from a microorganism of the genus *Mortierella* sect. *schmuckeri*.

26. The therapeutic agent of Claim 25, wherein said agent is delivered by a medium selected from the group consisting of a capsule, a parenteral formulation and a liquid diet formulation.